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Title: Looking back at 50 years of cutting-edge capabilities LANSCE
'underpins Los Alamos as a world-class scientific institution'

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BOX:

At a glance:

- **What's LANSCE?**

LANSCE (the Los Alamos Neutron Science Center) is a facility at the Lab with one of the nation's most powerful linear accelerators (LINAC), which is a half-mile in length.

- **What's an accelerator?**

An accelerator is a machine that uses electric or time-varying magnetic fields to accelerate nuclear particles to high velocities.

- **Who was Louis Rosen?**

In 1962, Rosen, a career-long Lab physicist, proposed building the world's most advanced nuclear science facility with the most-powerful, high-intensity-proton linear accelerator. He would become the facility's first director and be known as the father of LANSCE.

- **Why is it important?**

The Lab uses linear accelerators to improve safety and security as well as advance nuclear technology, among other areas. LANSCE's experimental areas support:

- stockpile sustainment
- future deterrents
- modern materials and manufacturing
- threat mitigation

- **Who uses LANSCE?**

In addition to Los Alamos staff, the facilities at LANSCE are also available for researchers from around the world.

STORY:

Looking back at 50 years of cutting-edge capabilities

LANSCE 'underpins Los Alamos as a world-class scientific institution'

By [the National Security Research Center](#)

What started with an idea and a memo has since grown into a one-of-a-kind, world-renowned facility that contributes to the nation's advancement of science and technology.

First known as LAMPF (Los Alamos Meson Physics Facility) until the 1990s when it became LANSCE (Los Alamos Neutron Science Center), the facility is celebrating the 50th anniversary of its first full-capacity proton beam on June 9, 1972.

Since then, LANSCE has contributed to a range of national security goals, such as supporting the Lab's stockpile stewardship program, helping to advance the science of medical radioisotopes, improving the understanding of hydrodynamics, and more.

"LANSCE has served the nation through its near-unique capabilities," said Alan Carr, Senior Historian at the National Security Research Center, which houses the facility's evolution through decades of documents, photos and other materials. "Since 1972, LANSCE has been the Lab's major experimental science facility and underpins Los Alamos as a world-class scientific institution. This was true 50 years ago and is still true today."

In commemoration of this anniversary, we're taking a look back at LANSCE's historic five decades, including its first director, earliest milestones and important contributions to national security.

Father of LANSCE

In 1962, Lab physicist Louis Rosen sent a memo to his boss proposing the creation of physics facilities at the Lab, said Madeline Whitacre, NSRC historian-archivist. Rosen was particularly interested in the development of a "meson factory" that would use high-energy accelerators to study subatomic particles. (Mesons are subatomic particles useful for studying and identifying quarks, which are subatomic particles believed to make up matter.)

Rosen's boss shared the memo with the Lab's then-Director Norris Bradbury, a physicist himself, Whitacre said. Both men had worked at the Lab during World War II as part of the top-secret effort to weaponize the atom and create a nuclear device.

Rosen later wrote: "Los Alamos, under the able leadership of Norris Bradbury, was seeking ways to diversify its contributions to the nation while enhancing its viability and vitality as one of the nation's foremost national security laboratories," according to his 1985 article "LAMPF – Its Origins, History, and Accomplishments."

His concept for LAMPF, or the Los Alamos Meson Physics Facility, was an interdisciplinary facility that would help secure the Lab as a leader in nuclear technology. His proposed facility would be a place where science would meet the challenges of national security, including energy security, medicine, environmental stewardship and nuclear non-proliferation.

“Louis Rosen knew nuclear science played a key role in helping address these challenges,” Whitacre said.

Furthermore, the proposed facility would include a high-intensity neutron beam that Rosen believed would be needed in the event of a nuclear test ban. (The Partial Test Ban Treaty (PTBT) was signed in 1963 and the Comprehensive Test Ban Treaty (CTBT) was signed, though never ratified, in 1996.)

Bradbury approved the project.

From proposal to world-class facility

By 1963, a proposal for what was first called the Los Alamos Meson Physics Facility, or LAMPF, was presented to the Atomic Energy Commission (AEC), which was the predecessor for today’s Department of Energy.

In March 1964, a scientific advisory panel, headed by Nobel laureate and former Los Alamos physicist Hans Bethe supported the proposals and recommended that such a facility be built “for the vigorous pursuit of the study of nuclear structure.” That same month an AEC special advisory committee recommended the facility be constructed at Los Alamos.

By December 1965, Congress authorized \$1.2 million (the equivalent of nearly \$11 million today) for the facility’s architectural and engineering design. The official groundbreaking was February 1968 and in October, construction began, which totaled \$57 million, equivalent to more than \$470 million today.

LAMPF began operations and in June 1970, the first section of the facility’s accelerator produced the first proton beam at 5,000,000 electron volts, followed by a proton beam with an energy of 100,000,000 electron volts produced a year later in June 1971. And on June 9, 1972, the full design energy of 800,000,000 electron volts was achieved for the first time.

That fall, the AEC dedicated the facility as the Clinton P. Anderson Meson Physics Facility, honoring the late New Mexico senator.

During 1974 – its first full year of operation – the facility beam was part of 73 experiments on behalf of 331 scientists from 72 institutions.

Rosen served as the facility's director until 1986. In the 1990s, though he had retired, Rosen remained involved in decision making for the facility.

He died in 2009.

LANSCE today

In 1995, the facility was renamed from LAMPF to LANSCE, with the new name meant to be more reflective of the broad range of neutron science topics that the facility had come to support, Whitacre said.

The most-recent full scale nuclear test conducted by the United States took place in 1992, and in 1994 congress established the stockpile stewardship program, directing that the national labs should report annually on the state and health of the stockpile. As the United States was moving away from nuclear testing, additional facilities were needed to understand and certify stockpiled weapons, Carr added.

LAMPF veterans working at LANSCE rose to that challenge. In the mid-1990s, supported by the Laboratory-Directed Research and Development (LDRD) program, they invented proton radiography (pRad), a new technique for imaging the insides of explosions while they occur.

“Even the data from those early pRad experiments impacted decisions relating to our nuclear stockpile,” said Mike Furlanetto, the current director of LANSCE, “and the ensuing 25 years of data have made major impacts on our understanding of stockpile science and nuclear counterterrorism.”

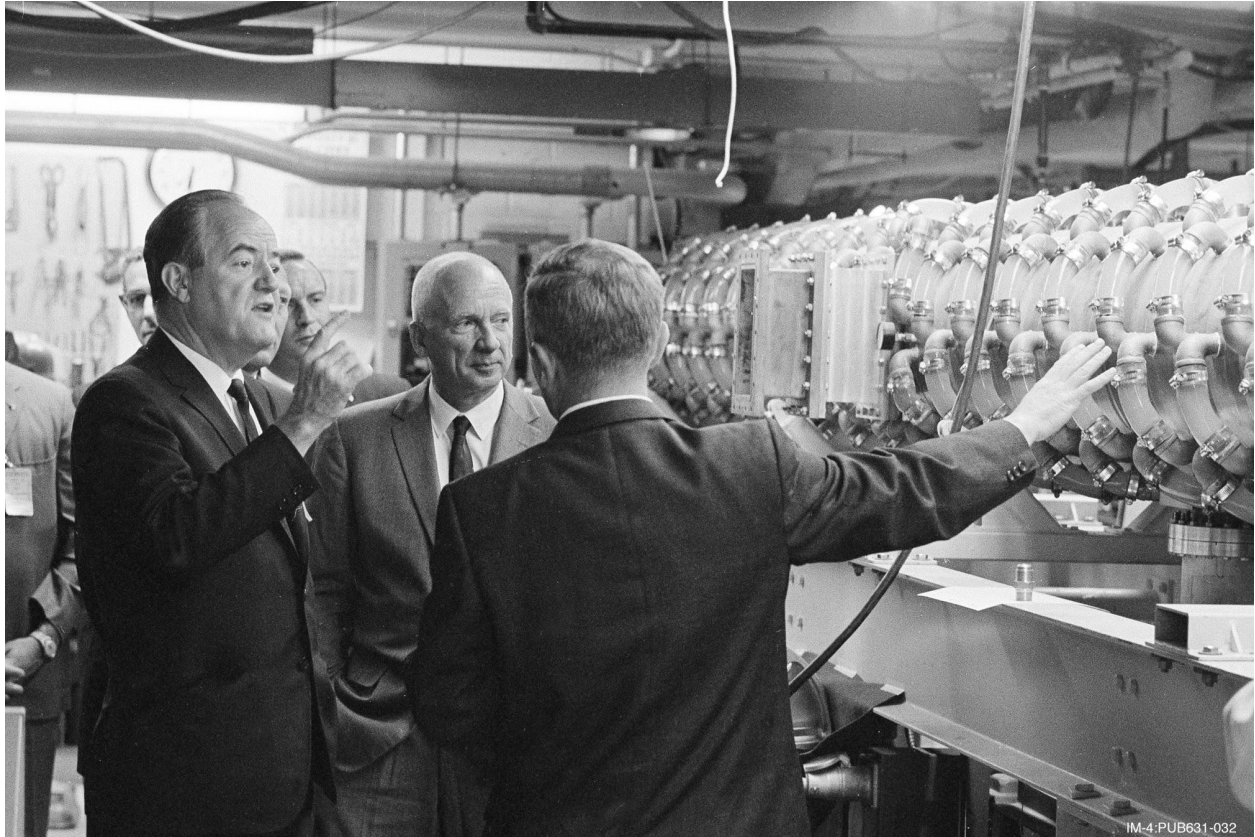
Additionally, the facility has supported a wide range of research topics, including medicine related to PET scans (imaging tests) and cancer diagnosis and treatment.

Today, LANSCE has a role in research on hydrodynamics and materials science topics, among others. A LANSCE users group remains in place to help manage proposals for beam time and to ensure that scientists outside of the Laboratory continue to have the opportunity to utilize the facility.

“LANSCE has had a user group since the LAMPF days, which was another brilliant idea of Louis Rosen's,” Furlanetto said. “By tying science at LANSCE to the broader community, we ensure that our science stays world-class and that we have a chance to recruit the best students and post-docs to work at LANL.”

Carr added: “For 50 years LANSCE’s main linear accelerator has provided unique capabilities to laboratory researchers and external partners. The facility continues to support our national security mission as well as basic research and development.”

Looking for more Lab history? Read, watch and listen at int-nsrc.lanl.gov.



caption: Vice President Hubert Humphrey visited LASL in 1966 to discuss the proposed LAMPF with Lab Director Norris Bradbury and LAMPF Director Louis Rosen.

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caption: Congressman Manual Lujan Jr. rides a bicycle during a visit to LAMPF in the 1970s. Bikes were used for quick transportation in the accelerator tunnel.

<https://drive.google.com/file/d/1vJAbq2m1vBk6cNbjnLQKqyLW25QlsTBO/view?usp=sharing>



caption: LAMPF's Cockcroft-Walton accelerators circa the 1970s. The accelerators brought protons up to speeds of 7,440 miles per second.

https://drive.google.com/file/d/1oypl5gs6Gx_ZSEGsfUKsqBj7A_G87fc2/view?usp=sharing



caption: Louis Rosen, left, led the development of the world's most powerful linear accelerator, which culminated in the creation of the Los Alamos Meson Physics Facility (LAMPF), known today as the Los Alamos Neutron Science Center (LANSCE).

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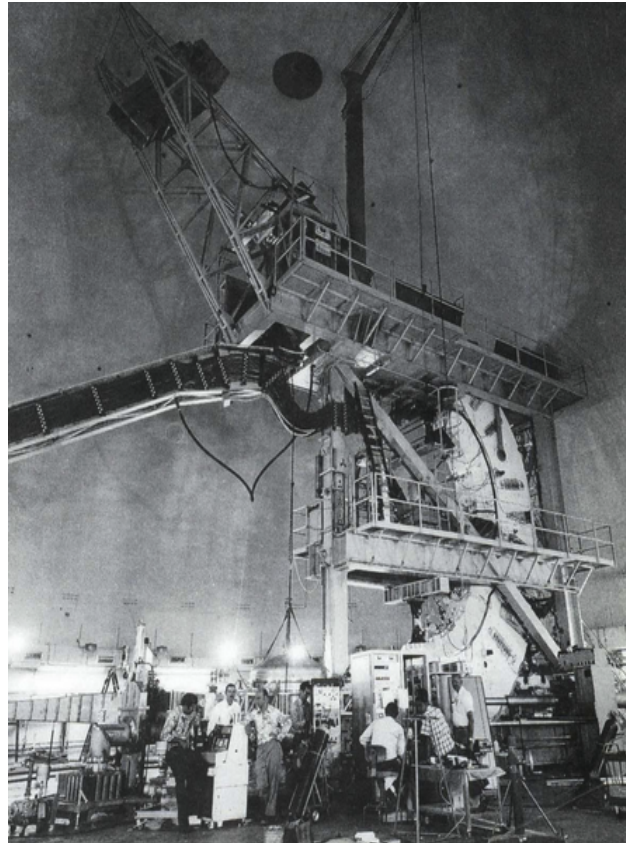
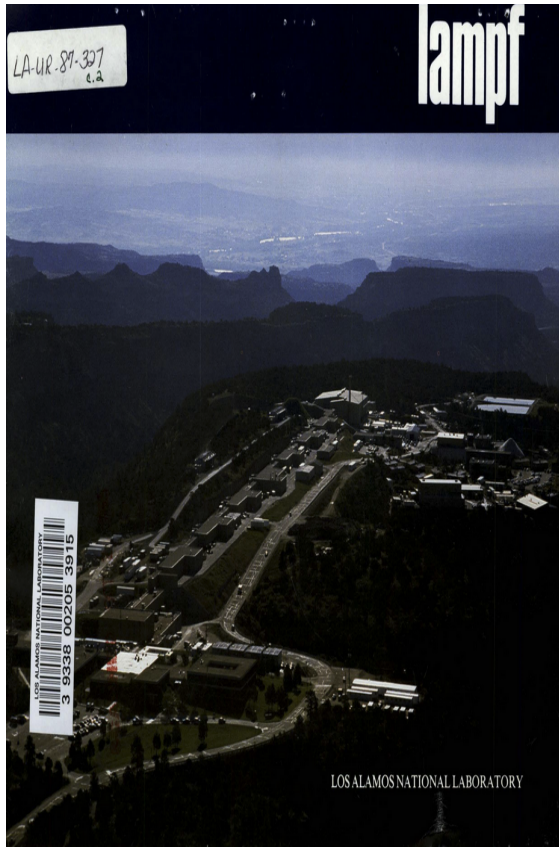
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caption: Personnel at LAMPF celebrate the success of the facility's first 800 MeV beam in 1972.



<https://drive.google.com/file/d/19ElnciUx1jK42Ae0lrwiEiL9Z6yiv5bu/view?usp=sharing>

caption: The fall 2013 issue of *Vistas*, a Lab publication dedicated to experimental physical sciences, featured Louis Rosen on its back cover. Rosen conceptualized the Lab's facility that is now called LANSCE and served as its first director.



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https://drive.google.com/file/d/1IpyWVU3xk7jjgN-XEVJnsT3_8pNz3qAl/view?usp=sharing

caption: Published promotional materials from January 1987 “acquaint the many LAMPF users and visitors with the facility, its accelerator and experimental capabilities, and its contributions to basic research” while showing some of the expansive facility’s exterior and interior.